

Applic. No. 09/556,662

Amdt. dated August 16, 2004

Reply to Office action of May 17, 2004

Claim Amendments

Claim 1 (currently-amended): In a method for regulating the temperature range of an NOx accumulator for purifying an internal combustion engine exhaust gas stream guided in an exhaust tract, the improvement which comprises:

discharging a heat flow from the exhaust gas stream upstream of the NOx accumulator as a function of an operating state of the internal combustion engine, for at least one of reliably preventing a maximum load temperature of the NOx accumulator from being exceeded and approximately maintaining a predeterminable temperature range;

discharging at least part of heat energy contained in the exhaust gas as the heat flow from the exhaust gas stream, at least one of upstream and downstream of a catalytic converter;
and

storing the NOx emissions intermediately in the NOx accumulator.

Claim 2 (cancelled)

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Claim 3 (currently amended): ~~The method according to claim 1,
which further comprises~~

In a method for regulating the temperature range of an NOx
accumulator for purifying an internal combustion engine
exhaust gas stream guided in an exhaust tract, the improvement
which comprises:

discharging [[the]] a heat flow from the exhaust gas stream in
two stages upstream of the NOx accumulator as a function of an
operating state of the internal combustion engine, for at
least one of reliably preventing a maximum load temperature of
the NOx accumulator from being exceeded and approximately
maintaining a predeterminable temperature range; and

storing the NOx emissions intermediately in the NOx
accumulator.

Claim 4 (original): The method according to claim 3, which
further comprises discharging the heat flow from the exhaust
gas stream upstream and downstream of a catalytic converter.

Claim 5 (original): The method according to claim 1, which
further comprises storing NOx in the NOx accumulator
additionally acting as an oxidation catalytic converter.

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Claim 6 (original): The method according to claim 1, which further comprises discharging the heat flow at 5 kW to 50 kW.

Claim 7 (original): The method according to claim 1, which further comprises forced cooling the exhaust tract upstream of the NOx accumulator with blown-off air from an exhaust gas turbocharger associated with the internal combustion engine.

Claim 8 (original): The method according to claim 1, which further comprises regulating the discharge of the heat flow, using a regulating variable being a predeterminable range of the temperature of the NOx accumulator as a function of the load of the internal combustion engine.

Claim 9 (original): The method according to claim 1, which further comprises forming a predeterminable range of the temperature of the NOx accumulator by a lower temperature of about 150°C and an upper temperature of 700°C.

Claim 10 (original): The method according to claim 1, which further comprises forming a predeterminable range of the temperature of the NOx accumulator by a lower temperature of about 150°C and an upper temperature of 500°C.

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Claim 11 (original): The method according to claim 1, which further comprises operating the internal combustion engine with an air/fuel ratio of $\lambda \leq 1$, until the NOx accumulator has reached its minimum operating temperature of about 150°C.

Claim 12-14 (cancelled)

Claim 15 (previously-presented): An exhaust gas catalytic converter system, comprising:

an internal combustion engine emitting an exhaust gas stream;

an exhaust tract guiding the exhaust gas stream;

an NOx accumulator disposed in said exhaust tract for storing NOx emissions intermediately and having a temperature range to be regulated for purifying the exhaust gas stream;

at least one catalytic converter disposed in said exhaust tract; and

at least one heat exchanger disposed upstream of said NOx accumulator in said exhaust tract.

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Claim 16 (original): The exhaust gas catalytic converter system according to claim 15, wherein said internal combustion engine is a diesel engine.

Claim 17 (original): The exhaust gas catalytic converter system according to claim 15, wherein said internal combustion engine is a lean-burn engine.

Claim 18 (previously amended): The exhaust gas catalytic converter system according to claim 15, wherein said at least one catalytic converter is a first catalytic converter, a second catalytic converter is disposed in said exhaust tract, said NOx accumulator is disposed between said first and second catalytic converters, and said at least one heat exchanger is disposed upstream of said first catalytic converter.

Claim 19 (previously presented) The exhaust gas catalytic converter system according to claim ~~[[14]]~~ 15, wherein said at least one catalytic converter is a first catalytic converter, a second catalytic converter is disposed in said exhaust tract, said NOx accumulator is disposed between said first and second catalytic converters, and said at least one heat exchanger is disposed between said first catalytic converter and said NOx accumulator.

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Claim 20 (original): The exhaust gas catalytic converter system according to claim 18, including an additional heat exchanger disposed between said internal combustion engine and said first catalytic converter.

Claim 21 (original): The exhaust gas catalytic converter system according to claim 18, wherein said first catalytic converter and said second catalytic converter are each three-way catalytic converters.

Claim 22 (original): The exhaust gas catalytic converter system according to claim 21, wherein said first catalytic converter has a very low oxygen storage capacity.

Claim 23 (original): The exhaust gas catalytic converter system according to claim 19, wherein said first catalytic converter and said second catalytic converter are each three-way catalytic converters.

Claim 24 (original): The exhaust gas catalytic converter system according to claim 23, wherein said first catalytic converter has a very low oxygen storage capacity.

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Claim 25 (original): The exhaust gas catalytic converter system according to claim 18, wherein said NOx accumulator and said second catalytic converter are integrated in one unit.

Claim 26 (original): The exhaust gas catalytic converter system according to claim 15, wherein said NOx accumulator has a three-way catalytic coating.

Claim 27 (original): The exhaust gas catalytic converter system according to claim 15, wherein said at least one heat exchanger has a cooling capacity of 5 kW to 50 kW.

Claim 28 (original): The exhaust gas catalytic converter system according to claim 15, wherein said at least one heat exchanger is a countercurrent heat exchanger.

Claim 29 (original): The exhaust gas catalytic converter system according to claim 28, wherein said at least one heat exchanger is a tube having two walls, an interior through which exhaust gas flows and a chamber between said two walls through which coolant flows.

Claim 30 (cancelled).

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Claim 31 (original): The exhaust gas catalytic converter system according to claim 29, wherein the coolant is water or air flowing as a forced flow through said at least one heat exchanger.

Claim 32 (cancelled)

Claim 33 (original): The exhaust gas catalytic converter system according to claim 31, including an exhaust gas turbocharger associated with said internal combustion engine, said exhaust gas turbocharger producing blown-off air flowing through said at least one heat exchanger.